

N-Channel 40-V (D-S) MOSFET

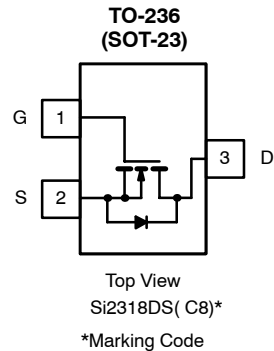
| PRODUCT SUMMARY | | |
|-----------------|---------------------------|-----------|
| V_{DS} (V) | $r_{DS(on)}$ (Ω) | I_D (A) |
| 40 | 0.045 @ $V_{GS} = 10$ V | 3.9 |
| | 0.058 @ $V_{GS} = 4.5$ V | 3.5 |

FEATURES

- TrenchFET® Power MOSFET

APPLICATIONS

- Stepper Motors
- Load Switch



Ordering Information: Si2318DS-T1 (with Tape and Reel)

| ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED) | | | | | |
|---|----------------|--------------------------|--------------|------------------|---|
| Parameter | Symbol | 5 sec | Steady State | Unit | |
| Drain-Source Voltage | V_{DS} | 40 | | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | | | |
| Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^{a, b} | I_D | $T_A = 25^\circ\text{C}$ | 3.9 | 3.0 | A |
| | | $T_A = 70^\circ\text{C}$ | 3.1 | 2.4 | |
| Pulsed Drain Current ^b | I_{DM} | 16 | | | |
| Continuous Source Current (Diode Conduction) ^{a, b} | I_S | 0.8 | | | |
| Power Dissipation ^{a, b} | P_D | $T_A = 25^\circ\text{C}$ | 1.25 | 0.75 | W |
| | | $T_A = 70^\circ\text{C}$ | 0.8 | 0.48 | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 to 150 | | $^\circ\text{C}$ | |

| THERMAL RESISTANCE RATINGS | | | | | |
|--|------------|----------------|---------|------|--------------------|
| Parameter | Symbol | Typical | Maximum | Unit | |
| Maximum Junction-to-Ambient ^a | R_{thJA} | $t \leq 5$ sec | 75 | 100 | $^\circ\text{C/W}$ |
| | | Steady State | 120 | 166 | |
| Maximum Junction-to-Foot (drain) | R_{thJF} | 40 | 50 | | |

Notes

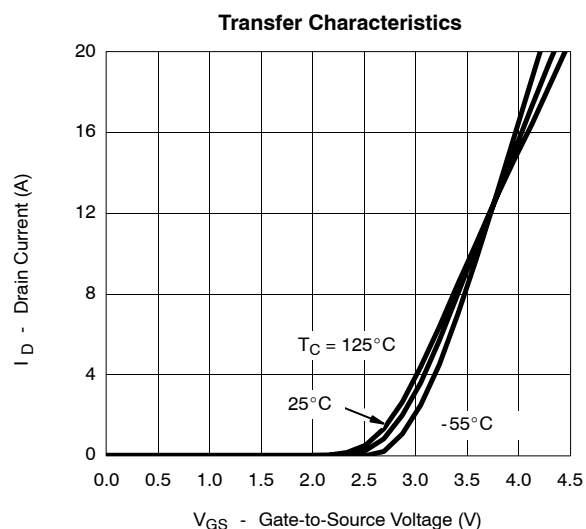
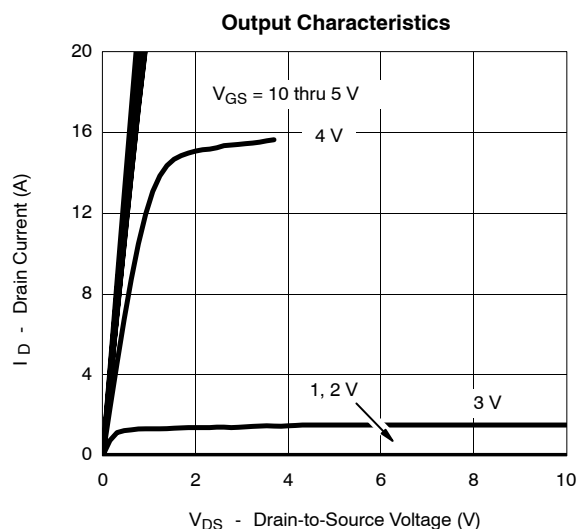
- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

SPECIFICATIONS (T_A = 25 °C UNLESS OTHERWISE NOTED)

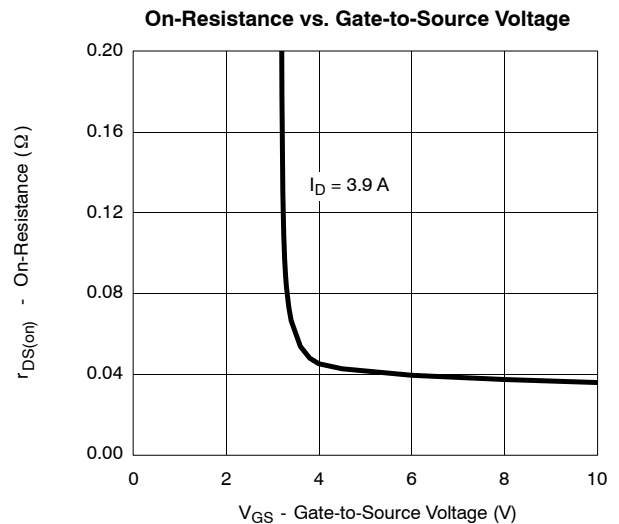
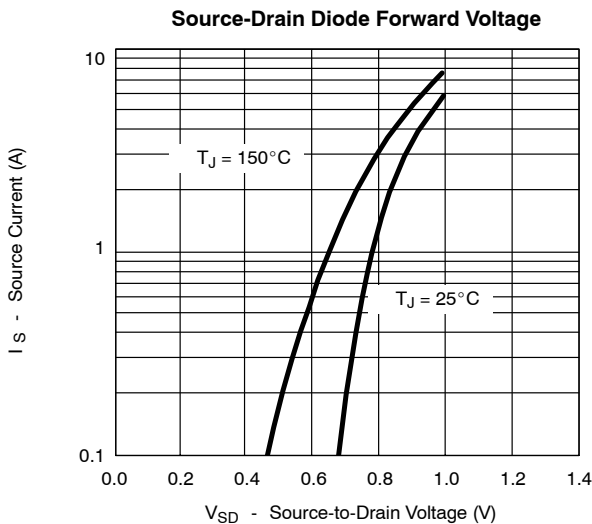
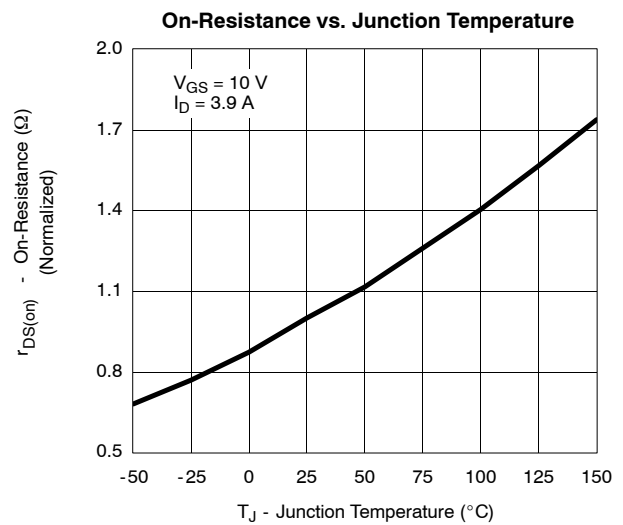
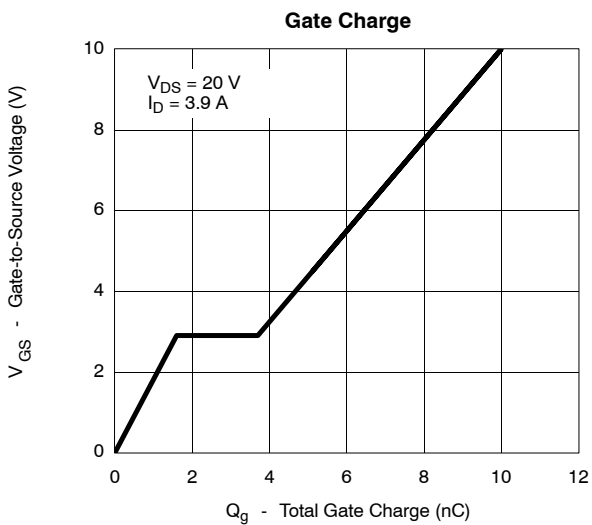
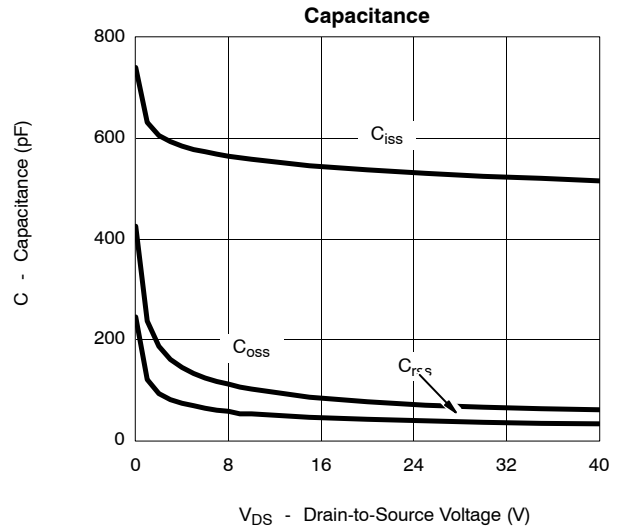
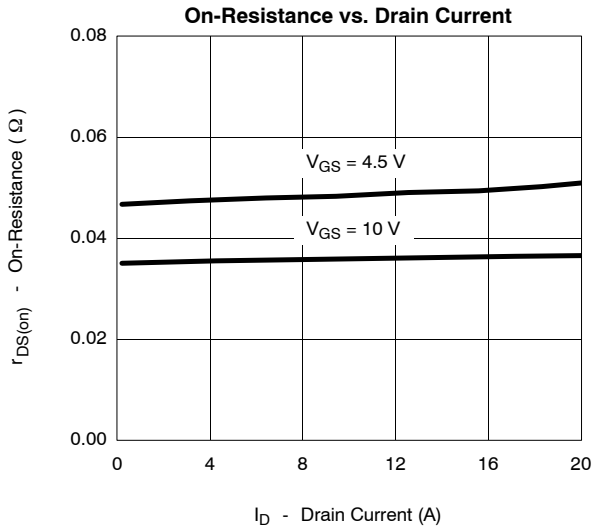
| Parameter | Symbol | Test Conditions | Limits | | | Unit |
|---|----------------------|--|--------|-------|-------|------|
| | | | Min | Typ | Max | |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | V _{(BR)DSS} | V _{GS} = 0 V, I _D = 250 μA | 40 | | | V |
| Gate-Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250 μA | 1 | | 3 | |
| Gate-Body Leakage | I _{GSS} | V _{DS} = 0 V, V _{GS} = ±20 V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 32 V, V _{GS} = 0 V | | | 0.5 | μA |
| | | V _{DS} = 32 V, V _{GS} = 0 V, T _J = 55 °C | | | 10 | |
| On-State Drain Current ^a | I _{D(on)} | V _{DS} ≥ 4.5 V, V _{GS} = 10 V | 6 | | | A |
| Drain-Source On-Resistance ^a | r _{DS(on)} | V _{GS} = 10 V, I _D = 3.9 A | | 0.036 | 0.045 | Ω |
| | | V _{GS} = 4.5 V, I _D = 3.5 A | | 0.045 | 0.058 | |
| Forward Transconductance ^a | g _{fs} | V _{DS} = 10 V, I _D = 3.9 A | | 11 | | S |
| Diode Forward Voltage | V _{SD} | I _S = 1.25 A, V _{GS} = 0 V | | 0.8 | 1.2 | V |
| Dynamic^b | | | | | | |
| Total Gate Charge | Q _g | V _{DS} = 20 V, V _{GS} = 10 V, I _D = 3.9 A | | 10 | 15 | nC |
| Gate-Source Charge | Q _{gs} | | | 1.6 | | |
| Gate-Drain Charge | Q _{gd} | | | 2.1 | | |
| Gate Resistance | R _g | | | 1.8 | | Ω |
| Input Capacitance | C _{iss} | V _{DS} = 20 V, V _{GS} = 0 V, f = 1 MHz | | 540 | | pF |
| Output Capacitance | C _{oss} | | | 80 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 45 | | |
| Switching | | | | | | |
| Turn-On Delay Time | t _{d(on)} | V _{DD} = 20 V, R _L = 20 Ω I _D ≅ 1.0 A, V _{GEN} = 10 V, R _G = 6 Ω | | 5 | 10 | ns |
| Rise Time | t _r | | | 12 | 20 | |
| Turn-Off Delay Time | t _{d(off)} | | | 20 | 30 | |
| Fall-Time | t _f | | | 15 | 25 | |

Notes

- a. Pulse test: PW ≤ 300 μs duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

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